Public Products List

PCI Title : SEA05TR : Metal mask change

PCI Reference : IPD/16/9613

PCI Created on : 15-Jan-2016

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

SEA05TR		

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND / OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Reliability Report

General Information	
Product Line	*U1M7*
Product Description	*ADVANCED CV/CC CONTROLLER*
Product division	*I&PC*
Package	*SOT23 6L*
Silicon process technology	*BCD6S*

Locations	
Wafer fab location	*CATANIA*
Assembly plant location	*CARSEM M Malaysia*
Reliability assessment	*Pass*

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
1.0	26-Nov-15	12	***A. Spiezia***	Original document

Issued by

A. Spiezia

Reviewed by

G. Capodici

Approved by

Alceo Paratore

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q100	: Stress test qualification for integrated circuits
8161393A	: General Specification For Product Development

2 RELIABILITY EVALUATION OVERVIEW

2.1 Objectives

This report contains the reliability evaluation performed on the U1M7 device diffused in CATANIA and assembled in SOT23 6L in CARSEM M Malaysia.

Considering that U1M7 device is an option of the already qualified UQ23 device (see report RR001609CS2047) and this option is marginal from reliability point of view, all positive results obtained from UQ23 can be extended by similarity to U1M7.

According to Reliability Qualification Plan, below is the list of the trials performed on reference device:

Die Oriented Tests (performed on UQ23)

- High Temperature Operating Life
- High Temperature Reverse Bias

Package Oriented Tests (performed on equivalent Test Vehicle)

- Preconditioning
- Temperature Cycling
- Autoclave
- High Temperature Storage

Electrical Characterization (performed on UQ23)

- ESD resistance test
- LATCH-UP resistance test

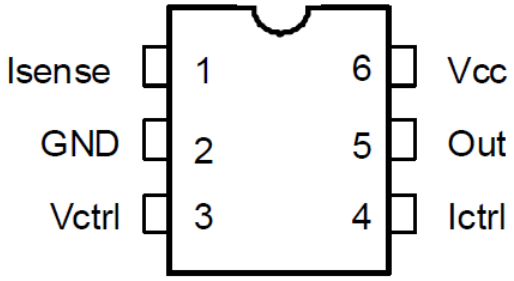
2.2 Conclusion

Taking in account the results of the trials performed the U1M7 diffused in CATANIA and assembled in SOT23 6L in CARSEM M Malaysia can be qualified from reliability viewpoint.

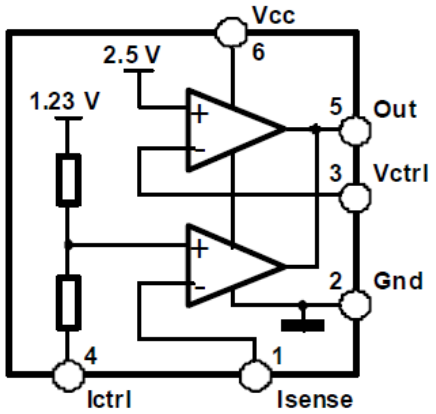
3 DEVICE CHARACTERISTICS

3.1 Device description

3.1.1 Pin connection



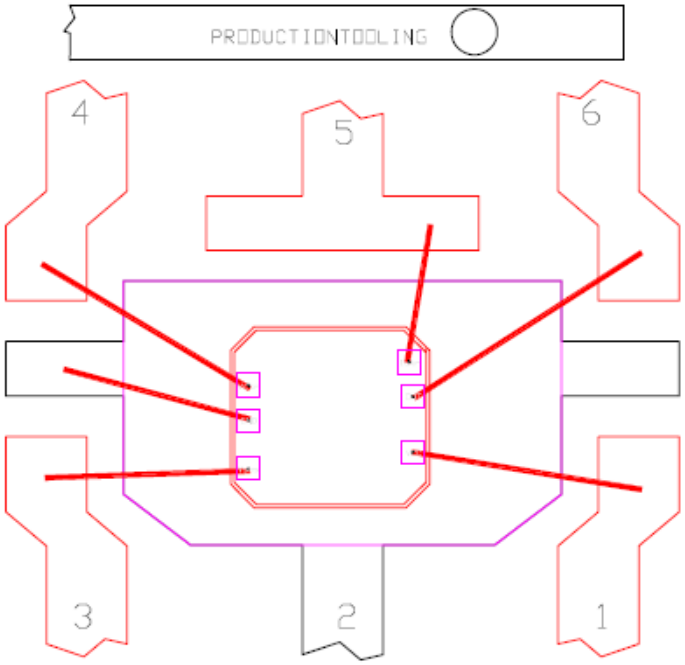
3.1.2 Block diagram



3.1.3 Bonding diagram

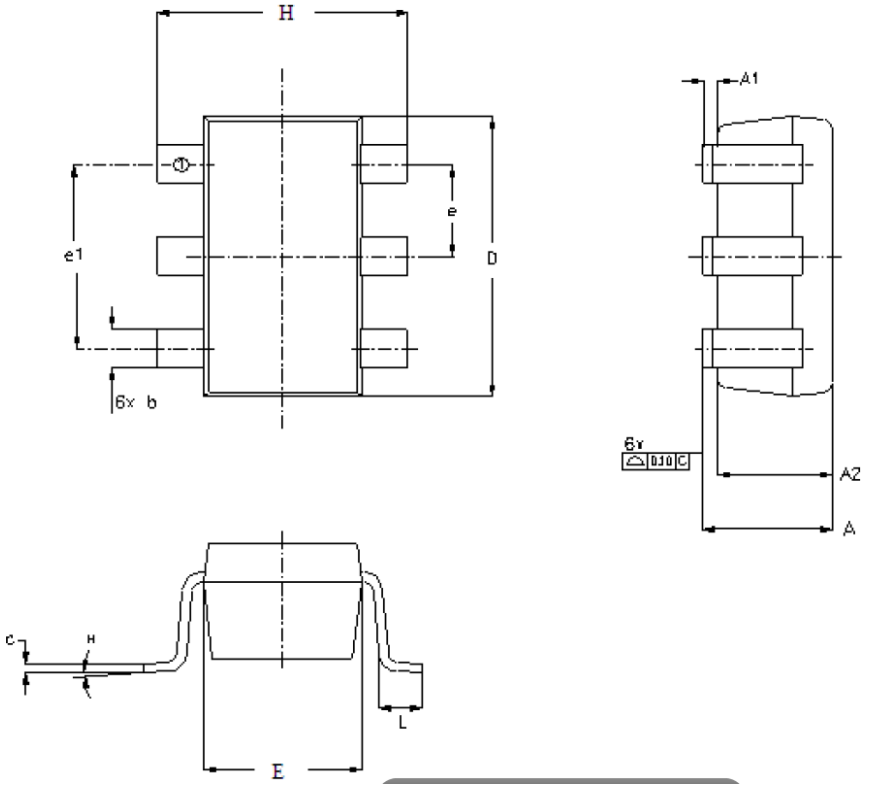
FRAME PAD : 39 x 64 mils / 0,981 x 1,626 mm

MAX DIE SIZE : 29 x 54 mils / 0,727 x 1,372 mm



3.1.4 Package outline/Mechanical data

Dim.	mm.			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		0.9	1.45		0.035	0.057
A1		0	0.1		0	0.0039
A2		0.9	1.3		0.035	0.0512
b		0.35	0.5		0.014	0.02
c		0.09	0.2		0.004	0.008
D		2.8	3.05		0.11	0.120
E		1.5	1.75		0.059	0.0689
e	0.95			0.037		
H		2.6	3		0.102	0.118
L		0.1	0.6		0.004	0.024
θ (degrees)		0°	10°		0°	10°



Traceability

Wafer fab information	
Wafer fab manufacturing location	*CATANIA*
Wafer diameter	*8 inches*
Wafer thickness	*280µm*
Silicon process technology	*BCD6S*
Die finishing back side	*Cr/Ni/Au*
Die size	*874 X 805µm*
Bond pad metallization layers	*Ti/AlCu/TiNARC*
Passivation	*TEOS/SiN/Polyimide*
Metal levels	*3*

Assembly Information	
Assembly plant location	*CARSEM M Malaysia*
Package description	*SOT23 6L*
Die pad size	*0.981 X 1.626mm*
Molding compound	*CEL8240 HF10LXC*
Wires bonding materials/diameters	*Au / 1mils*
Die attach material	*QMI519*
Lead solder material	*Sn*

4 TESTS RESULTS SUMMARY

4.1 Test plan and results summary

Die Oriented Tests

Test	Test short description (performed on UQ23)					
	Method	Conditions	Sample/ Lots	Lot Nb	Duration	Results Fail/SS
HTRB	High Temperature Reverse Bias					
		Tj=150°C Vin=36V,Vcc=6V,Vboot=42V	77	1	1000h	0/77
HTOL	High Temperature Operating Life					
	On chip-board	Tj=150°C Vcc=5V, Vin=21V	77	1	1000h	0/77

Package Oriented Tests

Test	Test short description (performed on equivalent Test Vehicle)					
	Method	Conditions	Sample/ Lots	Lot Nb	Duration	Results Fail/SS
PC	Pre-Conditioning: Moisture sensitivity level 1					
		168h 85°C/85% - 3 reflow PBT 260°C	100	1		0/100
AC	Autoclave					
	PC before	121°C 2atm	50	1	168h	0/50
TC	Temperature Cycling					
	PC before	Temp. range: -50/+150°C	50	1	1000cy	0/50
HTSL	High Temperature Storage Life					
	No bias	Tamb=150°C	50	1	1000h	0/50

Electrical Characterization Tests (performed on UQ23)						
Test	Method	Conditions	Sample/ Lots	Number of lots	Duration	Results Fail/SS
ESD	Electro Static Discharge					
	Human Body Model	+/- 5000V	3	1		0/3
	Machine Mode	+/ 200V	3	1		0/3
	Charge Device Model	+/ 1500V	3	1		0/3
LU	Latch-Up					
	Over-voltage and Current Injection	Tamb=85°C Jedec78 – Level B	3	1		0/3

5 TESTS DESCRIPTION & DETAILED RESULTS

5.1 Die oriented tests

5.1.1 High Temperature Operating Life

This test is performed like application conditions in order to check electromigration phenomena, gate oxide weakness and other design/manufacturing defects put in evidence by internal power dissipation.

The flow chart is the following:

- Initial testing @ Ta=25°C
- Check at 168 and 500hrs @ Ta=25°C
- Final Testing (1000 hr.) @ Ta=25°C

5.1.2 High Temperature Reverse Bias

This test is performed to evaluate die problems related with chip stability, layout structure, surface contamination and oxide faults.

The flow chart is the following:

- Initial testing @ Ta=25°C
- Check @ 168 and 500hrs @ Ta=25°C
- Final Testing @ 1000hrs @ Ta=25°C

5.2 Package oriented tests

5.2.1 Pre-Conditioning

The device is submitted to a typical temperature profile used for surface mounting, after a controlled moisture absorption.
The scope is to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.

5.2.2 High Temperature Storage Life

The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.
The scope is to investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding

5.2.3 Thermal Cycles

The purpose of this test is to evaluate the thermo mechanical behavior under moderate thermal gradient stress.
Test flow chart is the following:

- Initial testing @ Ta=25°C.
- Readout @ 500 cycles.
- Final Testing @ 1000 cycles @ Ta=25°C.

TEST CONDITIONS:

- Ta= -50°C to +150°C(air)
- 15 min. at temperature extremes
- 1 min. transfer time

5.2.4 Autoclave

The purpose of this test is to point out critical water entry path with consequent corrosion phenomena related to chemical contamination and package hermeticity.
Test flow chart is the following:

- Initial testing @ Ta=25°C.
- Final Testing (168hrs) @ Ta=25°C.

TEST CONDITIONS:

- P=2.08 atm
- Ta=121°C
- test time= 168 hrs

5.3 Electrical Characterization Tests

5.3.1 Latch-up

This test is intended to verify the presence of bulk parasitic effects inducing latch-up.
The device is submitted to a direct current forced/sinked into the input/output pins. Removing the direct current no change in the supply current must be observed.

Stress applied:

condition	NEG. INJECTION	POS. INJECTION	OVERVOLTAGE
IN low: 0V	-100mA	Inom+100mA	Vcc=54V
IN high: 3.3V	-100mA	Inom+100mA	Vcc=54V

5.3.2 E.S.D.

This test is performed to verify adequate pin protection to electrostatic discharges.
The flow chart is the following:

- Initial testing @ Ta=25°C
- ESD discharging @ Ta=25°C
- Final Testing @ Ta=25°C

TEST CONDITIONS:

- **Human Body Model** JEDEC STANDARD JESD22-A114
  CDF-AEC-Q100-002
- **Machine Model** JEDEC STANDARD EIA/JESD-A115
  CDF-AEC-Q100-003
- **Charge Device Model** ANSI/ESD STM 5.3.1 ESDA
  CDF-AEC-Q100-011